REMARKS

Claims 1, 3-6, 8-11 and 13-15 are pending in this application. By this Amendment, claims 1, 3, 4, 5, 8, 10, 11, and 14 are amended and claim 16 has been canceled. No new matter is added.

Allowable Subject Matter

Applicants thank the Examiner for the indication that claims 5, 6, 10, 11, 13 and 14 would be allowable if rewritten in independent form. Claims 5 and 10 have been rewritten in independent form. Because the remainder of the pending claims are allowable at least for the reasons discussed below, it is respectfully submitted that this application is in condition for allowance.

Objection to the Specification

The Office Action objects to claims 4, 10, 11, 14 and 16 for containing asserted informalities. Applicants respectfully submit that this rejection is overcome with the above amendments to claims 4, 10, 11, 14 and 16. Reconsideration and withdrawal of the objection to claims 4, 10, 11, 14 and 16 are thus respectfully requested.

Section 103 Rejection

The Office Action rejects claims 1, 3, 4, 8, 9, and 15 under 35 U.S.C. § 103(a) as being obvious over Ap (U.S. Patent No. 6,448,535) in view of Le Dall et al. (U.S. Patent No. 4,229,142). As the subject matter of claim 16 is incorporated into all of claims 1, 3, 4, 8, 9 and 15 in the above amendments, this rejection is now rendered moot.

The Office Action also rejects claim 16 under 35 U.S.C. § 103(a) as being obvious over Ap in view of Le Dall et al. and further in view of Hamano et al. (U.S. Patent No. 4,558,992). This rejection is traversed.

The present claims are directed to a cooling system for a fuel cell powered vehicle and fuel cell powered vehicle including a cooling apparatus. The present claims require, *inter alia*, primary and secondary circulation passages arranged to allow primary and secondary coolants to be circulated through primary and secondary circulation pumps, respectively. The primary and secondary pumps are connected to and respectively driven with first and second rotatable shafts on opposite sides of a single pump drive motor. With the above amendments to the pending claims other than claims 5-6, 10-11 and 13-14, to include the subject matter of claim 16, these claims now require that the flow rates of the primary and secondary circulation pumps are differentiated.

Ap discloses a cooling device for an electric vehicle powered by a fuel cell and "the fuel cell and at least the electric motor are cooled by two loops using different cooling fluids" (Ap column 1, lines 54-55). Ap further requires that the first loop "is traversed by a first cooling fluid which is de-ionised water, that is to say pure water, given that this represents the only fluid which can be used for cooling the fuel cell [while the second loop in contrast] is traversed by a mixture of water and of antifreeze (for example ethylene glycol) as used conventionally in the cooling circuits of motor-vehicle engines" (Ap column 3, lines 36-43).

As the Office Action correctly notes, Ap does not disclose primary and secondary pumps driven by a single motor. However, the Office Action asserts that Le Dall et al.

shows a single motor 25 driving first and second pumps via a shaft. The Office Action further asserts that it would have been obvious to one of ordinary skill in the art to include a single drive motor for the pumps, as shown in Le Dall et al., to simplify the design, manufacture and maintenance of the fuel cell structure.

However, Applicants respectfully note that Le Dall et al., which is intended for immersion in a liquid, is only used for pumping from a single liquid source. In particular, Applicants note that the Le Dall et al. device only has one outlet 19. The single liquid to be pumped can be pumped through the Le Dall et al. pumps either in parallel or in series and out through outlet 19. Le Dall et al. explains that if "the application requires high-flow pumping, the parallel configuration is used. This is the case, for example, of pumping out a tank or flooded basement. If on the contrary the application requires high-pressure pumping, the serial configuration is used. This in the case, for example, when watering land" (see Le Dall et al. column 5, lines 38-43).

Applicants respectfully submit that, without substantial and nonobvious modification, the Le Dall et al. device, which has only one outlet, would not have been, and could not have been, used to pump two different fluids in separate loops. Thus, Applicants further respectfully submit that the Le Dall et al. single liquid pumping device would not have been, and could not have been, combined with the Ap device which requires "two loops using two different cooling fluids." In addition, because Le Dall's pump device concerns a single liquid source, the combination of Ap and Le Dalls (cooling system) still requires a plurality of motors, which would not result in the claimed invention.

Hamano et al. discloses "a pair of pumps disposed at both extending ends of [a] rotary shaft to be connected in series to each other thereby to form a two stage compression structure" (Hamano et al. column 1, lines 35-40). Hamano discloses to switch two drive modes i.e. high pressure mode and low pressure mode, by way of controlling control valves. In the high pressure mode, the pumps are connected in series. In the low pressure mode, the pumps are connected in parallel.

The two pumps are connected in series during the high pressure mode and only one single liquid flows through the two pumps as in the case of Le Dall's pump device. Therefore, as previously described in connection with the Le Dall's pump device, the combination of Ap and Le Dall still requires a plurality of motors.

Meanwhile, the two pumps are connected in parallel during the low pressure mode. Both pumps discharge a low pressure fluid, respectively (column 2, line 42 ~). However, flow rates of these pumps are not differentiated.

Hamano explains the two pumps as "low pressure pump" and "high pressure pump". However, this does not mean that the low pressure pump and the high pressure pump are different in flow rate when they are connected in parallel. Rather the terms "low pressure pump" and "high pressure pump" indicate that during the high pressure mode, the low pressure pump operates for the low pressure-side compression and the high pressure pump operates for the high pressure-side compression (column 2, line 42~).

Applicants respectfully submit that the Hamano et al. device would not have been, and could not have been, used to pump two different fluids in separate loops with the flow rates of these pumps differentiated. Thus, Applicants further respectfully

submit that the combination of Ap and Hamano et al. does not render the claimed invention obvious because the combination fails to show the feature in that the primary circulation pump and the secondary circulation pump are constructed such that the flow rates of the primary and secondary circulation pumps are differentiated.

For at least the above reasons, reconsideration and withdrawal of the rejections of claims 1, 3, 4, 8, 9 and 15 and of claim 16 under 35 U.S.C. § 103(a) are respectfully requested.

Conclusion

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Counsel's Deposit Account 01-2300, making reference to Attorney Docket No. 106145-00018.

Respectfully submitted,

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